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ABSTRACT

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The Relationship of Age and Linguistic Production Capacity of Children to Parental Speech Adjustment

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Abstract

The present study compared the speech of fathers and mothers to young children in the age ranges of 19 to 29 months and 32 to 43 months. Audio tape recordings were made of the verbal interactions of 20 father-daughter dyads and 20 mother-daughter dyads while engaged in free play in the family home. Using verbatim transcripts of the sessions, the degree of parental speech modification as a function of the age and linguistic production capacities of the child was assessed. The results indicated that both fathers and mothers adjust certain aspects of their speech relative to both age and linguistic production skills. In addition, very similar patterns of speech adjustment were found for mothers and fathers. Specifically, parents of both sexes adjusted the length of their utterances as a function of the production capacity of the child and moderated the concreteness and diversity of their vocabulary relative to the age and production skills of the child with whom they were interacting.

Child Age and Linguistic Production Capacity as Determinants of Parental Speech Adjustment

A considerable amount of recent research has focused on processes underlying the child's acquisition of language. Only recently, however, have researchers attempted a detailed specification of the nature of the linguistic input to which the young child is typically exposed. It has now been consistently demonstrated that young children hear language samples that are syntatically simple, grammatically well formed, stated in very short utterances and which use relatively restricted vocabulary (Broen, 1972; Snow, 1972; Phillips, 1973; Newport, 1976; Cross, 1977), a linguistic style sometimes referred to as "motherese".

The majority of studies of verbal interactions with children have emphasized mothers' speech (e.g. Brown & Bellugi, 1964; Broen, 1972; Phillips, 1973; Snow, 1976; Cross, 1977). Recent studies, however, have shown that in addition to mothers, adult nonparents (Snow, 1972; Bohannon & Marquis, 1976), fathers (Golinkoff & Ames, 1979) and children (Shatz & Gelman, 1973; Berko-Gleason, 1973) use a

special speech register in addressing young children. Moreover, there is accumulating evidence that mothers, at least, modify their speech differentially relative to certain characteristics of the child listener. The age of the child has been most thoroughly studied in this regard. Snow (1972), for example, reported a positive relationship between the age of the child addressed and the complexity of mothers' speech. Thus mothers' speech to 2-year-old children was found to be cast in shorter utterances, to employ fewer subordinate clauses, to contain fewer pronouns and to be more repititous than was their speech to 10 year olds. Similar results were obtained by Phillips (1973) who compared mothers' speech to 3 month, 18 month and 28 month old children. Maternal speech to 18 month olds, while not different from speech to 8 month olds, was significantly less complex than speech to the 28 month olds. Broen (1972) reported similar differences in mothers' speech to children in the age range 18-26 months as compared to children in the age range of 45-94 months.

A few studies have focused on characteristics of the child other than age as relating to the degree of maternal speech modification. Cross (1977), for instance has re-

ported that for children 19 to 32 months of age, the degree of mothers' speech adjustments was related to both age and linguistic proficiency of the child. Of 62 parameters of maternal speech assessed, various forms of repetitions, expansions and questions were significantly negatively correlated with the age, mean length of utterance and receptive capacities of the children, while maternal mean length of utterance was positively correlated with these same factors. Similar results were obtained by Newport (1976) who correlated 35 measures of mothers' speech to their children in the 12 to 27 month age range with nine parameters of child language as well as with the age of the child. Among the results was the finding that mothers' mean length of utterance was positively related to the age, but not mean length of utterance of the child.

No comparable data is available concerning how other adults might modify their speech relative to certain features of a child listener. Specifically, the relative lack of research attention to the way in which fathers speak to young children of different ages and different levels of linguistic proficiency is somewhat surprising in view of the growing appreciation of the role of the father in affecting

child development (Lamb, 1976). Thus, the recent study by Golinkoff and Ames (1979) while comparing the speech of mothers and fathers to young children, was not concerned with the degree to which parental speech modification may vary according to relevant characteristics of the child listener such as age or linguistic development.

It was the purpose of the present investigation to address this issue specifically, in order to determine if fathers, like mothers, modify their speech relative the age and/or linguistic production capacities of the child. In addition, the design of the present study affords a direct comparison of fathers' and mothers' speech to children spanning critical ages during the language-learning years.

Method

Subjects

Twenty young girls along with their mothers and fathers participated in the study. Families were recruited by letter through several local day care centers. The children ranged in age from 19 months to 43 months (M = 30.6 months). Ten of these children comprising the younger group were in the age range 19 months to 29 months (M = 22.4 months) and 10 comprising the older group were in the age range 32

months to 43 months (M = 38.8 months). The children's mean length of utterance, computed on the basis of their speech to both mother and father, ranged from 1.0 morphemes to 4.3 morphemes (M = 2.5 morphemes). Thirteen of the children were first born and seven were later born. All of the fathers and most of the mothers had interests outside of the home including full- or part-time jobs or the continuation of schooling. The socio-economic status of the families ranged from lower middle to upper middle class.

Apparatus

A Sony cassette recorder (model TC-92) and Memorex (MRX_2 Oxide) cassette tapes were used to audio tape all sessions. Three multipart toys were used as a basis for parent-child interactions. These were the Weebles Mickey Mouse Magic Kingdom and The Weebles West manufactured by Hasbro Industries and the Sesame Street Club Playhouse manufactured by Fisher-Price Toys. The Weebles West toy had been demonstrated on the basis of pilot testing to be effective in eliciting parent-child verbal interactions. The other toys are similar in format and complexity. All are intended by the manufacturer to be appropriate for children in the age range of 2-6 years.

Procedure

Each child participated in two separate sessions, one session with her mother and one session with her father. Each session was approximately 20 minutes in duration. Half of the children within each age range participated in the mother-child session first, and half of the children participated in the father-child session first. A different toy was used as a basis for verbal interactions in each of the sessions for a given child in order to help maintain the child's interest. Sessions were conducted in the family home at the parents' convenience. The time of day at which the sessions were conducted therefore varied between 10 a.m. and 8 p.m. The majority of the sessions, however, were conducted on weekday evenings. For each child the mother-child and father-child sessions occurred within a ten-day interval.

At the beginning of each session, the observer conversed informally with the parent and child. The parents were then given general instructions for engaging their child in play. These instructions were intended to place minimal restrictions upon the nature of the interactions to take place and consisted of a paraphrasing of the following:

As you know, our purpose here is to gain a better understanding of the process of language development in children. In order to do this I would like to tape record you and your child while playing with this toy. You are completely free to play with your child in any manner you like. I would, in fact, like you to be as natural as possible and to play with your child just as you normally would for about twenty minutes. If your child loses interest in the toy, that's perfectly alright. I would ask you to continue the interaction for about twenty minutes, however. I would also like you to try to ignore my presence as much as possible. Are there any questions?

The toys were set up on the floor with the tape recorder placed inconspicuously, four to five feet away. The observer then began recording and moved to the edge of the room. The next twenty minutes of verbal interactions were recorded. At the end of twenty minutes the parent was informed, and the tape recording was terminated. At the end of the second session for a particular family, the parents were informed of the variables which would be considered and

any remaining questions which they may have had were answered.

Preparation of Transcripts

Transcripts were made of all parent-child sessions. These transcripts consisted of written verbatim accounts of all dialogue between parent and child occurring prior to and including the one hundred sixtieth intelligible utterance of the parent. Transcripts were prepared by either the first author or by an assistant and then rechecked for accuracy by the first author against the recording. The utterance boundries were determined on the basis of phonetic cues using standard punctuation to mark the termination of the utterance. Consistent with Shipley, Smith and Gleitman (1969) and Broen (1972), it was found that pauses fell reliably between utterances permitting the segmentation of utterances on the basis of phonetic cues. In the case of unintelligible responses, the transcriber indicated in brackets that an unintelligible utterance had occurred. In the case of doubtful responses, the transcriber recorded his/her best estimate of what the response had been within brackets. In both cases, which were relatively infrequent, the utterances involved were omitted from the subsequent analyses.

Parental Speech Categories

The first forty completely intelligible utterances were eliminated from subsequent analyses to allow for a suitable "warm up" period. The next 100 completely intelligible parental utterances for each session were scored in terms of the categories below. All analyses were therefore based on a total corpus of 4000 parental utterances. Four dependent measures were derived from the data:

1. Mean length of utterance (MLU) was calculated in morphemes according to the procedures described by Brown (1973) with the following modifications: First, scoring began with the forty-first utterance rather than with the second page of the transcript as recommended by Brown. The rationale was that this procedure would allow for greater consistency in terms of the number of utterances constituting the "warm up" period, since the length of the parents' utterances was expected to vary. Second, only completely intelligible utterances were scored whereas Brown had advocated including doubtful utterances also. Third, words such as "hm" and "oh" were included in the present analyses whereas Brown suggested eliminating these "fillers." The rationale for including such words in the present study was

that these words are of potential communicative significance. Fourth, whereas Brown had recommended counting catenatives (e.g., wanna, hafta, etc.) as single morphemes for young children, in the present study these were counted as constituent morphemes since the data base was adult speech.

2. Type-token ratio was calculated as a measure of vocabulary diversity. The Type-token ratio is a ratio of the number of words spelled differently to the total number of words in the sample.

3. The ratio of statements to total number of utterances was calculated. Statements included imperatives as well as declaratives.

4. Concreteness rating, defined as the ratio of concrete nouns to total nouns, was determined. A concrete noun was operationally defined as one whose referent is potentially discriminable by sight or touch. For example, nouns such as "table," "house," etc. were scored as concrete as were proper names and occupations. Words such as "music," "fun" and "time" were not counted as concrete.

All 40 transcripts were scored by the first author in terms of the above variables. In each condition, a randomly selected twenty percent of the transcripts were scored by an

independent rater. Pearson Product-moment correlations revealed interrater reliability on all four dependent measures to be in excess of r = .95.

Results

In order to compare the speech of mothers and fathers to younger and older children, the data was analyzed using a 2 (age of child) x 2 (sex of parent) factorial multivariate analysis of variance (MANOVA). Cell means and standard deviations for each of the four dependent variables are presented in Table 1. This analysis resulted in a significant effect due to the age of the child, F (4, 33) = 4.76, $p < .005$. Neither the sex of parent main effect nor the age of child x sex of parent interaction was significant.

Insert Table 1 about here

Separate 2 (age of child) x 2 (sex of parent) factorial analyses of variance (ANOVA) were performed for each of the dependent measures.

The results of the ANOVA performed on mean length of utterance (MLU) yielded a marginally significant effect due to the age of the child, F (1, 36) = 3.55, $p < .07$. There

was, therefore, a trend for the parents of the older children to use longer utterances in speaking to their children (M = 4.63) than did the parents of the younger children (M = 4.15). Neither the sex of parent effect nor the age of child x sex of parent interaction was significant.

The Type-token ratio analysis resulted in a significant age of child effect, F (1, 36) = 8.08, $p < .01$, indicating that parents of the older children used a more diverse vocabularly in addressing their children (M = .296) than did the parents of the younger children (M = .264). Neither the sex of parent factor nor the age of child x sex of parent interaction yielded significant values.

The results of the ANOVA conducted on the concreteness ratings also resulted in a significant age of child effect. F (1, 36) = 6.53, $p < .025$, indicating that the parents of the younger children used a more concrete set of nouns in addressing their children (M = .930) than did the parents of the older children (M = .864). Significant effects were not found for either the sex of parent factor or for the age of child x sex of parent interaction.

The ANOVA performed on the percent of statements used by the parents showed no significant effects.

Univariate analyses therefore indicated that parents of the older children used a more diverse and less concrete vocabulary in speaking to their children than did the parents of the younger children, and that parents of the older children also tended to use longer utterances although this difference was not statistically significant at conventional levels.

Since child age and MLU were not perfectly correlated ($r = .73$), a separate set of analyses was performed in order to determine the effects of the children's level of linguistic production on the degree of parental speech modification. Using a median split procedure, the data was reorganized into high and low language proficiency groups of equal size on the basis of the children's composite MLU calculated for both parental sessions. MLU was calculated according to Brown's (1973) method for all intelligible child utterances occurring between the forty-first and one hundred fortieth parental utterances for each session. The MLU's of the ten children comprising the low MLU group ranged from 1.0 to 2.4 morphemes ($\underline{M} = 1.72$), while those for the ten children comprising the high MLU group ranged from 2.5 to 4.3 morphemes ($\underline{M} = 3.38$). The data was then analyzed using a 2 (MLU of

child) x 2 (sex of parent) factorial multivariate analysis of variance (MANOVA). Cell means and standard deviations for each of the four dependent measures are presented in Table 2. This analysis resulted in a significant MLU of child effect, F (4, 33) = 7.74, $p < .0005$. Neither the effect due to sex of parent nor the MLU of child x sex of parent interaction was statistically significant.

Insert Table 2 about here

Separate 2 (MLU of child) x 2 (sex of parent) factorial analyses of variance were performed for each of the dependent variables.

The results of the ANOVA performed on parental MLU revealed a significant MLU of child effect, F (1, 36) = 11.04, $p < .005$. Therefore, the parents of the children with higher MLU used longer utterances in verbal interaction with their children (M = 4.78) than did the parents of the children with lower MLU (M = 4.0). Neither the sex of parent effect nor the MLU of child x sex of parent interaction was statistically significant.

The Type-token ratio analysis resulted in a significant

effect due to child MLU, F (1, 36) = 8.73, $p < .005$, but no significant effects due to sex of parent or due to the MLU of child x sex of parent interaction. Thus, parents of the higher MLU children used significantly more diverse vocabulary in speaking to their children (M = .297) than did the parents of the lower MLU children (M = .263). The results of the ANOVA conducted on the concreteness ratings resulted in a significant effect for MLU of child, F (1, 36) = 4.29, $p < .05$, but showed no significant effects due to sex of parent or to the MLU of child x sex of parent interaction. Therefore, the parents of the lower MLU children were found to use a more concrete vocabulary (M = .924) than did the parents of the higher MLU children (M = .869).

The results of the ANOVA performed on the percentage of statements used by the parents resulted in no significant effects.

Thus, the results of the MLU of child x sex of parent analyses are in essential agreement with the age of child x sex of parent comparisons in demonstrating that mothers and fathers adjust the length of their utterances and the diversity and concreteness of their speech as a function of both the age and language maturity of the child with whom they

are interacting.

Discussion

The primary purposes of the present study were to compare the speech of mothers and fathers to young children in critical language-learning years and to determine if fathers, like mothers, modified their speech relative to the age and/or linguistic proficiency of the child addressed, a heretofore unexplored question. The present results have demonstrated very similar patterns of speech adjustment for mothers and fathers. In fact, the uniformity of speech of mothers and fathers is quite striking. Both mothers and fathers were found to adjust the length of their utterances to a significant extent as a function of the production capacity of the child and also to moderate the concreteness and diversity of their vocabulary relative to the age and production skills of the child. More specifically, parents of the younger children tended to use shorter utterances and used a significantly more concrete and less diverse vocabulary in interacting with their children than did the parents of the older children. Similarly, when the data was reorganized on the basis of the children's linguistic production capacities the mothers and fathers of the less ling-

uistically sophisticated children were found to speak in significantly shorter utterances which employed a more concrete and less diversified vocabulary. Not only, then, are fathers capable of speaking "motherese," as previously demonstrated by Golinkoff & Ames (1979), but more importantly they also moderate the degree of speech adjustment as do mothers relative to the age and linguistic production capacities of the child with whom they are conversing. Fathers, therefore, appear to be as sensitive as mothers to these important characteristics of children.

It is important to emphasize that mothers' behavior in the present study is consistent with previous research findings relative to speech adjustment as a function of listener age and linguistic proficiency. These findings have now been extended to include fathers. The complete range of speech input available to the young language learning child, however, remains to be investigated. Thus, a description of speech of those with whom the child typically interacts with some frequency, for example, mothers, fathers, siblings and peers, is a necessary base from which to examine language development. Once the nature of the input language has been determined researchers may direct their efforts to discover-

ing the process whereby the child makes use of this input to discover, within a very brief span of time, the rule systems which underly and make possible the productive use of language.

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Table 1

Means and Standard Deviations of Parental Speech Measures by Child Age and Sex of Parent[a]

	Parental Speech Measures			
	Mean Length of Utterance	Type-Token Ratio	Concreteness Rating	Percent of Statements
Younger children				
Mothers	3.97 (.558)	.27 (.023)	.93 (.074)	.58 (.196)
Fathers	4.33 (.878)	.25 (.043)	.93 (.083)	.52 (.148)
Older children				
Mothers	4.56 (.014)	.30 (.041)	.86 (.011)	.59 (.126)
Fathers	4.71 (.876)	.29 (.033)	.87 (.066)	.55 (.134)

[a]Numbers in parentheses are standard deviations.

Table 2

Means and Standard Deviations of Parental Speech Measures By Child Linguistic Production Capacity (MLU) and Sex of Parent[a]

	Parental Speech Measures			
	Mean Length of Utterance	Type-Token Ratio	Concreteness Rating	Percent of Statements
Younger children				
Mothers	3.84 (.636)	.273 (.023)	.922 (.074)	.641 (.156)
Fathers	4.16 (.979)	.254 (.043)	.927 (.088)	.526 (.151)
Older children				
Mothers	4.69 (.705)	.300 (.041)	.868 (.105)	.530 (.152)
Fathers	4.88 (.611)	.294 (.032)	.871 (.062)	.548 (.131)

[a]Numbers in parentheses are standard deviations.